Bidimensional optical solitons in a quadratic medium

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Résumé en anglais	The modulation evolution of a short localized optical pulse in a crystal belonging to one of the classes 42m, 43m, 3m, 6mm, and with a non-vanishing second-order nonlinearity, is considered. In (2 + 1) dimensions, the partial differential system accounting for it can be reduced to the completely integrable Davey–Stewartson system, if some conditions are satisfied. The first integrability condition represents a balance between the third-order Kerr effect and the cascaded second-order nonlinearities, while the second condition is an equilibrium between the dispersion and the kinetic factor of the electro-optic–optical rectification wave interaction. For anomalous dispersion, the obtained Davey–Stewartson system is of the type I, that admits localized soliton solutions. Lump solution, algebraically decaying in all directions, exist in any case satisfying the above conditions.
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